1 stepped pressure equilibrium code : fv00aa

Contents

1.1 outline

1. Returns "force" vector and its derivative with respect to geometry.

1.1.1 construction of force vector

1. The force vector, $\mathbf{f}$, is defined

$$f_{l,j} \equiv [[p + B^2/2]]_{l,j}. \tag{1}$$

2. If spectral constraints are required, i.e. if `Lgeometry.ge.4`, then the force vector includes

$$f_{l,j} \equiv (R_\theta X + Z_\theta Y)_{l,j}. \tag{2}$$

1.1.2 quantitative measure of force-imbalance

1. The internal varible, $|f| \equiv$ `forceerr`, is constructed:

$$|f| \equiv \frac{1}{E} \sum_l \frac{1}{J} \sum_j |f_{l,j}|, \tag{3}$$

where the summation is over the interior interfaces, i.e. $l = 1$, `Nvol`-1, and $J \equiv$ `mn` is the number of Fourier harmonics, `mn=Ntor+1+Mpol*(2*Ntor+1)`.

2. Note that this quantity is normalized to the total energy, E, as defined

$$E = \sum_l \int_{\mathcal{V}_l} \left(\frac{p}{\gamma - 1} + \frac{B^2}{2} \right) dv. \tag{4}$$

1.1.3 construction of Hessian

1. The Hessian, $\nabla \mathbf{f}$, is constructed as the derivative of the force, $\mathbf{f}$, with respect to the Fourier harmonics, $R_{l,j}$ and $Z_{l,j}$, that describe the geometry of the l-th interface.

fv00aa.h last modified on 2012-12-18 ;